Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)
	)
IP-Enabled Services	)
	)
E911 Requirements for IP-Enabled Service Providers	)
	)
WC Docket No. 05-196	)

REPLY COMMENTS OF IPOSI

Timothy N. Dunn
iPosi, Inc.
13847 W. 66th Place
Arvada, Colorado 80004
303-463-1497
tdunn@iposi.com

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To: Chief, Wireline Competition Bureau

COMMENTS OF IPOSI, INC.

iPosi, Inc.[1], submits these reply comments in response to the Bureau's *Public Notice'* request for comment and reply comment in the Notice of Proposed Rulemaking (NPRM). We wish to reply to the comments in the record in order for the Commission to effect appropriate rules, timeframes and enforcement procedures consistent with its regulatory powers. We believe the Commission also exerts informal power that promotes new technology and best results by offering the industry future direction and guidance that is useful for encouraging new capability for E911 over VoIP services.

Technology Choices

The consensus view from a majority of the commenters is that the Commission should not adopt a single technology specified by a specific date[2]. iPosi agrees with this position and believes the Commission should use its influence to drive towards industry adoption of standards useful for the purpose of locating VoIP callers. Further, we believe that it is essential for the Commission to provide VoIP industry incentive towards the innovations of technical solutions to

[1] iPosi was founded in 2005 by industry leaders with over 90 years combined experience from major wireless equipment and top-tier service providers, GPS, satellite and precise-positioning system firms, the defense communication sector and the E911 industry.

[2] For Example, see AT&T Comments at Pg 5 , BellSouth Comments at Pg 2 , BRETSA Comments at Pg 3, Cisco Comments at Pg 10, Earthlink Comments at Pg 3, Motorola Comments at Pg 3, NENA Comments at Pg 9, Qwest Comments at Pg 5, SBC Comments at Pg 9, Time-Warner Comments at Pg 7, VON Coalition Comments at Pg 12.

meet the needs of the 911 community. Commenters suggested items such as workshops, industry collaboration and even end-to-end test beds which would stimulate technology development and acceptance[3]. In this way, we can let the outcomes not the methods drive us towards a standardized, cost-effective, reasonable method for location determination. We do not want to repeat the CMRS experience; various commenters have suggested they are in or are aware of technologic development at present[4] and that there are no economical, commercial market ready, widely available solutions for Automatic Location Technology.

Automatic Location Technology Clarification

We take the opportunity through the NPRM reply comment process to resolve the contending proposals and recommendations with regard to location determination for VoIP devices. Automatic location determination is essential to true E911 services. We cite the many NPRM commenters that reviewed and analyzed network device geo-registration as not preferred if automatic solutions were developed to serve VoIP E911.

Based on the comments we believe the industry is not yet offering the full possibilities and to a degree speaks from a position of the status quo or the snails pace of incremental development of traditional, legacy technologies. iPosi believes there is time to adapt and deploy newer solutions. However, over the next 2-3 years, a much larger percentage of 911 calls will be handled over VoIP as there are a larger number of consumers making the switch to VoIP. New developments can therefore still impact the bulk of VoIP devices deployed as the volume of calls and number of callers grow large. Since the industry speaks consistently to the frailties of manual survey and recording of network end-points[5], we will limit the analysis to only those solutions that promise automated position measurements. There are technologies and solutions coming

[3] See for example, SBC Comments at Pg 12, TCS Comments at Pg 7, Global IP Alliance/Schulzrinne comments at Pg 10, Washington State E911 Program at Response Paragraph 1, Texas-CSEC Comments at Pg 4-5.
[4] See for example, Cisco Comments at Pg 6-8, RNK Telecom Comments at Pg 5-6, Rosum Comments at Pg 4, Skype Comments at Pg 11-13, TCS Comments at Pg 4-6, Vonage Comments at Pg 10-11.
[5] See Bill D. Herman Comments at unnumbered Page 2, RNK Comments at Page 5.

which will meet or exceed the Commission requirements of Phase II CMRS location requirements, asked by one PSAP commenter to be “single-digit” error in location. It is not clear that some of the solutions which are being discussed at present will ever reach that goal.

What is clear is that manual methods are bulky and cumbersome for both VoIP operators as well as their end users. We must go through the controversy of technical discussion and evaluation of all the proposed methods.

WiFi Ranging and Proximity Based Solutions

WiFi access points could in theory be one of the best means of associating one’s location to pinpoint VoIP 911 calls. WiFi signals transmit over a short range; the devices are plentiful and inexpensive; methods exist that can take measurements based on some additional software relieving hardware cost (in wireless devices). However these attractive features do not offset other factors that make this solution inadequate for E911.

Range estimation or proximity using WiFi access points requires surveying areas to match the WiFi transmitter signals to a geographical area. The size of the area (relative accuracy) depends on the number of samples and ability of the equipment to make fine power estimates. These estimates are also a function of the complex set of conditions that affect signal level, which can change as objects in the field between or around the transmitter and the location sensing receiver change. As conditions change the initial measurements “age” or degrade with time thereby requiring re-survey to maintain confident location predictions.

WiFi access point survey and calibration is an enormous task requiring time and tolerance to update record lag. The common method is to walk or drive testing large areas using specialized test equipment and software. This requires driving many tens of thousand miles to completely calibrate just the many cities across all US urban and suburban areas. A comprehensive survey is only efficient if there is a stable universe and a high and consistent density of transmitters where it may be needed to support 911 calls. Proposals exist for

wandering subscribers to voluntarily "contribute" or download measurements into community databases. Whether this would obviate additional calibration tests is speculative and voluntary compliance is not assured. Finally the placement of transmitters is completely arbitrary. For instance, outside of higher population density, urban areas WiFi signals are usually not present.

Databases that hold the WiFi position, if locations are certified, could be a good interim technique for handling incoming 911 calls from Voice-over-WiFi. This would address itinerant connections from such phones but it is in no way a general-purpose technique.

TV Signal Based Location Solutions

Some have commented on the use of TV broadcast signals as a resource to estimate VoIP device position[6]. This technology was first demonstrated in Great Britain in the 1990's for tracking vehicles or people using general broadcast signals. TV signals offer an interesting reference to locate devices that can receive surrounding broadcast carrier signals that is more typical of mobile applications than nomadic or fixed services. For VoIP however, this technology requires expensive (relative to the VoIP device itself) additional hardware to sense and process the TV signals. Other system requirements include deploying a special external reference network. The network is comprised of monitoring receivers located in every local market where TV broadcast towers are present. The reference network enables the end devices to observe a common view of the incoming TV signals in order to compare the same signals to those received at the reference station. This enables the receiver to solve for its position if the TV transmitter and reference station locations are known and communication between the end-point device and the reference network is available. TV signals are high powered, and to an extent are able to penetrate buildings in the area nearby the tower.

To position accurately from nearby transmitters, high quality TV signals must surround the device seeking to position itself accurately. Since neither the TV towers nor the VoIP devices

[6] NPRM 05-116, Paragraph 57, Rosum Comments at Page 4.

move in typical applications, bad signal conditions arising from indoor and urban canyon can not be moved away from thus leaving the receiver subject to reflected multipath signals. Reliable reception, at least in terms of providing accurate location from distant stations has been claimed, but as signal path distances grow even over flat terrain so do the errors. The signal path departs from a straight line of sight from the tower site depending on the frequency due to reflections and refractive bending both adding potentially kilometer-level errors due to longer signal path lengths. In building reception is especially challenging from more distant stations as signal energy weakens and disperses toward longer indirect paths.

We suspect that TV ranging could operate in premium portable devices that offer CMRS and WiFi connectivity where the TV ranging augments mobile GPS in handsets so equipped. This offers three redundant methods (GPS, TV ranging, and Mobile network Cell ID or equivalent) to offer the widest set of instant location coverage.

Traditional and Assisted GPS

Traditional and mobile assisted GPS have been challenged by multiple commenters[7] who talked about them as having both pros and cons. iPosi agrees with this position. GPS, in its present form, will be incapable of true indoor, in-building coverage.

GPS is, however, the best solution for accurate ranging. Using conventional receivers, signals are strong enough to adequately position devices in most outdoor and semi-obscured locations. As one takes GPS receivers indoors the signals weaken by an amount very dependent on the type of structure. Assistance methods used in mobile GPS exist. These methods overcome losses in houses that act to modestly attenuate signals while high-rise and corporate buildings highly attenuate satellite-transmitted GPS signals. While mobile (assisted) GPS can overcome limited attenuation it is incapable of overcoming losses encountered in most buildings.

[7] See for example BRETSA Comments at Pg 4-5, Cisco Comments at Pg 8, Global IP Alliance Comments at Pg 8, Information Technology Industry Council Comments at Page 6, RNK Telecom Comments at Pg 7, Skype Comments at Pg 14, TCS Comments at Pg 10, United Online Comments at Pg 9-10, United States Telecom Association Comments at Pg 6, VON Coalition Comments at Pg 13, Vonage Comments at Pg 3.

Despite these current limitations, GPS offers the best path toward ubiquitous positioning that is both effective and inexpensive. GPS (and future global navigation satellite systems such as Galileo) globally scales and offers a common way to address accurate emergency call location everywhere in the US and internationally. This scalable effect greatly improves economics, standardization and reduces time to market and provisioning costs.

iPosi is encouraged by techniques we have developed that overcome classic limitations of GPS using conventional mobile methods. We further believe that new methods from iPosi developers could address near term industry[8] and Commission requirements. We look forward working with the Commission and other interested VoIP E911 stakeholders in reviewing how to improve this coverage.

CONCLUSION

iPosi is committed to the realization of proactive positioning of the VoIP client for the greater public benefit of accurate and timely location of a caller in distress. We continue to stand prepared to answer any questions posed by the Commission.

Respectfully submitted,

IPOSI, INC.

By:

/s/_____

Timothy N. Dunn
iPosi, Inc.
Dated: September 12, 2005

[8] See NENA comments Pg 9; "Until the accuracy of geodetic solutions can be improved, and PSAPs are universally equipped to utilize this information, this is simply unacceptable." iPosi believes a large number of PSAPs are currently equipped to utilize geodetic information due to their implementation of Phase I and Phase II CMRS solutions and ability to utilize geodetic data passed in CMRS solutions.